P • E • R • S • P • E • C • T • I • V • E

Graphic

Spring 1986 Volume 1, Issue 1

The Graphic Arts industry is swiftly moving into another age. Traditional tools are being replaced by faster, more effective electronic counterparts. Those in the industry are aware of the changes — some of us are already involved in and committed to the transformation. But for those who are just at the brink of change, there is an ever-growing need for information.

That's why GraphiComp Design and Ampersand Typographers got together to create this newsletter. We hope you will find it meets some of your needs for information.

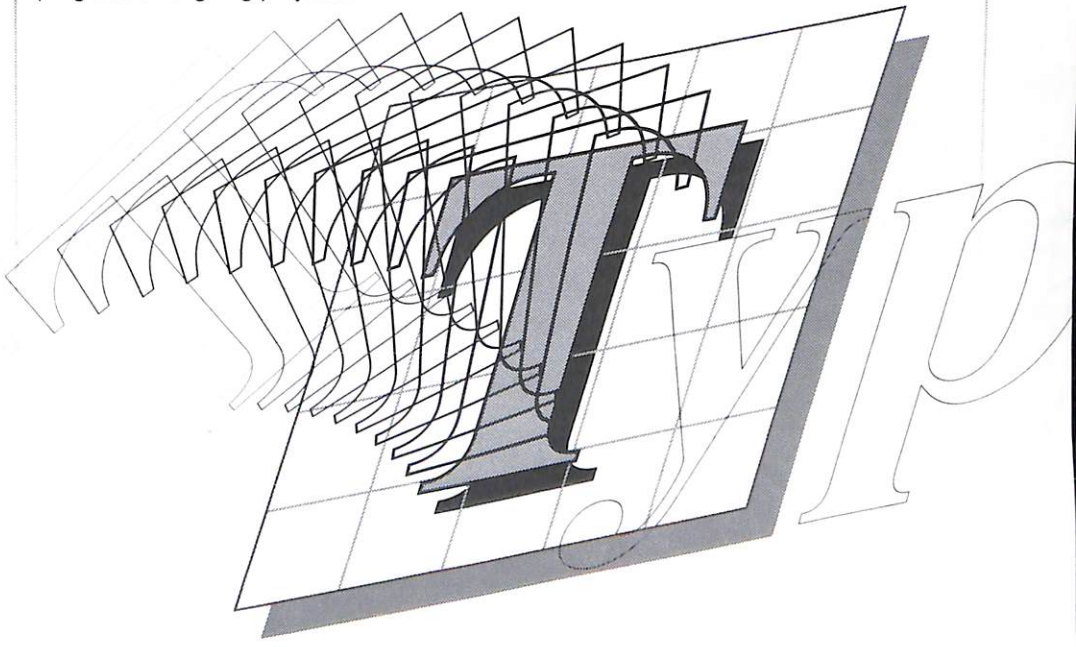
The newsletter will serve a fluid, but graphically-oriented, purpose. Articles may supply a technical solution to a problem facing others in our field, they may cover a faster way of creating a graphic image, or perhaps merely expose clients to some of our services of which they may not be aware. Significantly, the newsletter will also give us a chance to show our stuff. It will be a vehicle to show others what this equipment and a bit of imagination can do, all at the low-cost, high-quality values that people are coming to expect of a revitalised industry. It might also protect our ever-dwindling supply of samples of our work! Much of the material in this issue is culled from talks, demonstrations and training we have given over the past few months.

Desktop Publishing

Desktop Publishing is now a highly popular subject in graphics journals and computer magazines. Some are even devoted entirely to the field. Briefly, Desktop Publishing is the ability to create an entire publication, including typography and graphic elements, on one micro-computer— all with no paste-up. Many systems are currently available in a wide range of capabilities and prices. Low cost laser printers have made near-typesetting quality available to anyone with a personal computer.

The equipment, software and techniques mentioned in the following pages represent *our* way of achieving the effects we aim for and in no way do we imply that ours is the *only* way of working in Electronic Publishing. However, companies entering the product field often make expansive claims about being able do anything with their equipment and anyone considering purchase of any of these systems should thoroughly investigate the capabilities of the whole system from concept to camera-ready art before making any concrete decisions. Another popular item to watch out for is "vapourware"—computer software that is supposed be available soon to solve a certain problem and yet never materialises. You should believe it *only* when you see it on the market.

Some systems, such as the carefully designed Macintosh—PostScript—LaserWriter/Linotron combination we are using, do work, and work extremely well. They allow the user a tremendous amount of flexibility matched only by his or her needs. Having been in the marketplace for well over a year this system has been around long enough to have most of the bugs ironed out, while at the same time having been tested in all manner of graphic situations. Some minor loopholes remain in the system but fortunately they are few enough to make it a wonderfully worthwhile investment. Not all Desktop Publishing systems can make that claim. Though it is still the responsibility of the user to press the programmers and software distributors to solve the technical problems that remain, awaiting their resolution should not hinder the progress of ongoing projects.



Graphic I • M • A • G • I • N • A • T • I • O • N

GraphiComp Design is an innovative service that specialises in dynamic computer-generated graphics. We design and produce a wide variety of publications and promotional material with high quality, cost-effective results.

Our current work is based on several years of traditional graphic design experience. Now, integration with advanced technology has enabled us to enhance the design process. With electronic publishing, absolute control over the page moves to the hands of the designer. Our design decisions are made right on the screen and we are always working with "final art".

We utilise Apple Macintosh computers to create PostScript files. PostScript is an advanced new page description language that controls both the Apple LaserWriter or the Linotronic 300 series of phototypesetters from Allied Linotype at a resolution of between 635 and 2540 lines per inch.

Our Services

Corporate identity

Page layout and design

Newsletters

Report and manual generation

Illustration

Audio-visual presentations

Film and video animation

Macintosh graphics consulting

Page layout and design
Our page make-up technique results in a swift turn-around time. We can even capture documents created on your own computer or word processor of almost any type. Documents can be sent to us as standard ASCII text files via modem, thereby eliminating the need to re-key data. Whether it's a two-page flyer or a three hundred page manual, we can design the publication from scratch or match the design to an existing publication to retain a corporate visual identity.

Illustration
Our equipment enables us to produce a wide range of illustrations with accurate and inexpensive results.

- maps
- charts and graphs
- complex technical diagrams
- symbols
- technical illustration

Audio-Visual Presentations
Whether it's a slide show or an overhead presentation, we can take the project from concept through to final transparencies. In a presentation, graphic elements are just as important as the text. Given the material for the presentation we will first create a design for the project and then maintain that look throughout the entire presentation. Typestyles, design motifs, and colours are all chosen to complement the text.

A Complete Service
We have working relationships with several reliable companies who supply us with the services necessary to produce a high-quality publication or presentation. Printers, typographers and photographers; their services are chosen based on the quality level and budget of your project. These services provide us with the optimum combination of traditional and advanced techniques to meet our clients' needs.

Postal services will find us at:
782 Gerrard Street East, Suite 2
Toronto, Ontario M4M 1Y6
Computers can find us on:
CompuServe 72477,2244
CNCP 21:AHY 001

T • Y • P • E • S • E • T • T • I • N • G

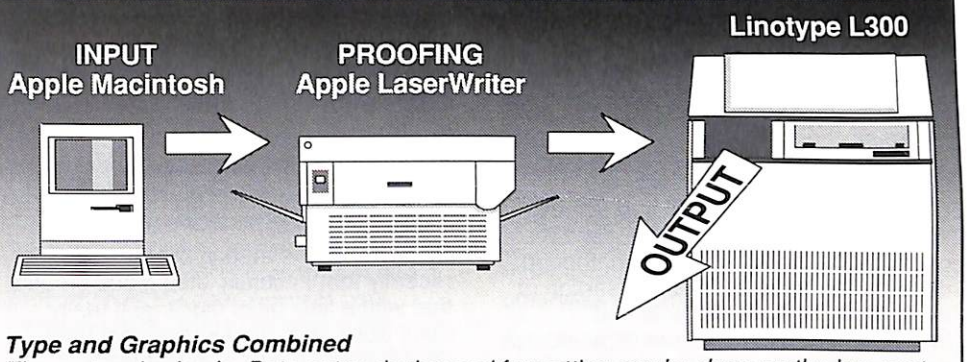
In the past, when you needed type, you provided the Typographer with hard copy (Manuscript) and specific instructions. The typographer laboured over your job for what seemed like an eternity and presented you with a Galley Proof. You then indicated any AA's (Author's Alterations) and PE's (their mistakes), and returned the marked-up Galleys to them for corrections. If you had no further changes to make, you proofed the next set of Galleys for corrections and additional PE's. This scenario might be repeated any number of times according to the degree of skill of the Typographer and your accuracy in marking up the job, but eventually you got your type. It was a costly, time-consuming procedure, fraught with frustration both for the Typographer as well as for the client.

It was thought by industry futurists that telecommunications would have a dramatic effect on the established procedures for buying type. Telecommunications enabled the type buyer to send their files over the phone or on disc to the Typesetter (as distinguished from Typographer), often many miles away, for setting. The theory was that since the text had already been keyboarded once and proofed for errors, the author's manuscript would return set correctly and with no additional need for proofing or re-setting. In actual practice, however, this turned out not to be the case.

It was still necessary for the Typesetter to go through the job and insert the mnemonic codes (instructions) required by the system to set it. It was found that additional errors were being introduced during the insertion of the codes as well as during data transmission, and although the manuscript had been keyboarded, the actual savings in cost were not nearly as great as had been anticipated because inserting the codes required by the system was still a tedious and time-consuming chore.

But perhaps the biggest single disadvantage to the buyer was that even though the text had been keyboarded once and proofed, he or she had little or no idea how the final job would look.

A Desktop Publishing System



Type and Graphics Combined

The system is simple. Data entry, design and formatting can be done on the low-cost Macintosh computer. Proofing can then be done on a medium quality laser printer. After corrections and a final laser-printed proof, the same file can be sent to the L300 for final camera-ready output.

With the Linotype L300 full typographic quality output is now available to Macintosh users. At a resolution up to 2450 lines per inch (lpi) the output of the L300 is unsurpassed by any known typesetting device. Additionally, the L300 fully supports graphics output. Apple, Dataproducts and QMS all have 300 lpi PostScript compatible laser printers on the market.

Do-it-Yourself Typesetting

A recent development has been the advent of the Typesetting Service Bureau, which provides you with a phone number and a manual the size of the local telephone directory which details all of the mnemonic codes required to allow you to set the type yourself. The major drawback again, aside from the learning curve and the amount of time required to set the job, is that even though you might, through constant proof stages, manage to send the job free of errors - in most cases you had absolutely no idea how the final job would appear. It would not be uncommon to get as much as half of a 500 page book job re-run for formatting changes.

Do-it-Yourself Page Layout

With the advent of the Macintosh, PostScript and the Allied Linotype L300 laser imagesetter the frustration and expense of type mark-up has disappeared. This makes *you* the typesetter, using your Macintosh and software to generate typeset files. Your files are then sent to an L300 for outputting. Its operator need not edit, amend or corrupt your files in any way. There are no codes to be entered by you, or by the operator.

Ampersand is the first fully operational user of the L300 RIP system in Canada. Those who want quality commercial typesetting can now input their material on a Macintosh and run the file through our typesetter. We have no doubt that they will be as overwhelmed as we have been by the quality of type and graphics output.

Without the need for file manipulation or mnemonic encoding, it enables us to provide our customers with the highest quality type available from any source. This results in costs far below the average (as much as 900% lower when graphics are included) for similar jobs set by traditional methods.

Our price list for output text only*

1-50 pages	$ 10.00 per page
51-100 pages	$ 9.00 per page
over 100 pages	$ 8.00 per page

*These prices are based upon 635 lines per inch resolution and running time not exceeding 5 minutes per page. Higher resolutions are available if required, at a slightly higher cost per page. An hourly rate will apply if time limitations are exceeded.

Ampersand Typographers **(416) 422-1444**

—MacDraw to PostScript—

Finally, I made it work! I took a MacDraw image, converted it to PostScript and inserted it into a JustText document.

JustText is a code-oriented page layout program—poor with graphics, but GREAT with type! We use it to achieve the accuracy and flexibility we need for page layout. On the other hand, though its documentation speaks of insertion of bit-mapped images and scanned images, neither of these are as useful for a graphic designer as object-oriented artwork. We do practically all our illustration in MacDraw and MacDraft so, until recently, physical paste-up was still required to combine both graphic elements and text for camera-ready artwork... but not any longer.

For months I'd known that in order to get a PostScript file of a Draw document, you must do the following:—

- Ensure that the LaserPrep and LaserWriter driver are installed on the disc.
- Drag the artwork up into the top left corner of the page.
- Do the Page Setup and select "Print".
- Click "OK" and immediately go Command–F. You can tell it worked if the standard LaserWriter Dialogue box then tells you it's creating a PostScript file.
- Back out at the desktop you'll find a new text document icon simply called "PostScript".

So much for the theory, but it wasn't until recently that I actually tried it out. I found that with a little bit of diddling, it really does work. With some additional PostScript you'll be able to edit a MacDrawing onto your page and, unlike in PageMaker or ReadySetGo, it will come out *exactly* as if you had printed directly from MacDraw. Better, in fact, because you can even edit (at your own risk!) the PostScript that the LaserWriter Driver gives you.

The Diddling

Assuming that your text is now in it's final form and that you've indented out the space reserved for your art, you can open the aforementioned PostScript file. If you've never seen PostScript before, it looks like a heap of garbage—but don't worry. If you are familiar with PostScript, you will immediately notice that this PostScript file created by the LaserWriter Driver is almost unrecognisable when compared to Adobe's *true* PostScript. The Apple version is full of abbreviations and hidden definitions—"`64 gr level`" means the same thing as Adobe's "`1 setgray`". Provided that you know the drawing was correct when you made the file, don't worry about it. Select the part of the document from the end of the Prologue (the last comment of the Prologue is likely to be "`%%Page: ? 1`", grab what follows next). Cut down to just before the Trailer comments. If you see "`0 page`" then you know you've gone a wee bit too far.Having inserted the selected portion into your JustText document preceded by the code `{ps}` and ended with `QQ`, you can now add the diddling that I spoke of. See the listing.

It may look pretty complicated, but you could almost copy the coding given here. That's how I do it. I copy a Draw to PS text file off my JustText Master Disk every time I want to insert a Draw document on a page. Naturally it will need modification, but generally only the coordinates and other "global operators" ie., scale factors, concatentation, rotation, etc. If all you need are global operators on the art then you don't even need to understand the Draw PostScript.

There is now another, somewhat confusing new-kid-on-the-block. The LaserWriter driver February 1986 update (Version 3.0) creates a PostScript that is even more difficult to understand— "`64 gr level`" now becomes "`64 gr`". The print files are smaller, but the adventurous diddler will find editing them is more difficult. Not only have abbreviations become smaller but the way of plotting objects has changed. I am working on a routine to use with the new driver.

Several years from now I may be wondering why I bothered with all this hassle. As a designer, though, I don't think it's too much to ask for total control over my artwork, and I *do* want the highest degree of accuracy possible from my computer. I know it's capable, and the results show it's certainly worth taking the initial trouble to find out how to do it.

...Simon Tuckett

—MacDraw to PostScript—

Put **this** at the head of your Draw PostScript...

```
{ys}                  %% Save your vertical position
{ps}                  %% PostScript pass-through command
7 794 translate       %% Brings it onto your page
10 -10 translate      %% Move it down into position
1 -1 scale            %% Cancel Apple invert
.5 .5 scale           %% Implement global operators
op                    %% Start of Draw PS
0 0 xl blah blah and so on...
```

Until you get to the end of it all when you insert the following...

```
54 313 gm
484 313 lin           %% End of Draw PS
grestoreall           %% Restore default settings
initgraphics          %% Invert back again
QQ                    %% End of PostScript
{yr}                  %% Restart text with a hard position
{f8}{p8}{l10}         %% Re-initalise your text
```

This routine does not work with LaserWriter Driver Version 3.0 (February 1986)

With the Macintosh, overall operation is extremely easy. That's why so many non-computer types are buying and using them. The operating environment is similar from one software package to the next and most people can, and many expect, to be able to run a program effectively without ever having to look at the manual. That's fine initially... who wants to read a manual when they've just bought a new program? But the importance of reading a manual cannot be over-stressed. However, good programmers are not necessarily good writers and several fine programs have fallen victim to a poorly written manual—though even the worst manual often has numerous little gems hidden away. Unfortunately, you have to dig because the writers often fail to see what features would be most beneficial to a potential user. The "Align Objects" feature of MacDraw is a case in point.

Having used a resource editor to implement command keys for most of the commands in MacDraw (menu selection was wearing my mouse feet down), I now find that the key for "Align Objects" is one of the most worn on my keyboard. Where is it mentioned in the manual? Near the back. Some features, and clever techniques aren't even mentioned in a manual because it was written before anyone had a chance to use it extensively. Here are some techniques that we find important and some interesting discoveries we've made over the past year of using MacDraw.

Grow Your Own Defaults

When starting up in Draw it's always a good idea to go into the document and set it for your preferences. My personal preferences for a No-name drawing are: Grid Off, Show Rulers, Metric, Zero Point Unlocked, Hide Ruler Lines, 50% LaserWriter Page Setup, Reduce to Fit... Now that's quite a lot of settings to make. Rather than make them for every document I simply go into a preset blank document with all the settings already made and go "Save As" under a new title.

Optional Shift

The Option key and the Shift key are extremely important in MacDraw, particularly when working with text. Text is invariably difficult to position when you click on a block of text and drag it around with only the block's outline to guide you. Well, if you press the Option key at the same time, you'll be able to see a gray version of your type as you drag it. Use it, it helps. Especially when positioning superscripts and subscripts. Naturally the function's speed decreases in direct proportion to the complexity of your moving object. This function, by the way, can also operate in conjunction with the Shift key which, used by itself, constrains movement to 90° or 45° angles.

Scaling

Have you ever wished that your drawing was just a little bit larger, but were afraid that the proportions would go all over the place if you grabbed the corner of the grouped illustration. Here's a way of doing it:—

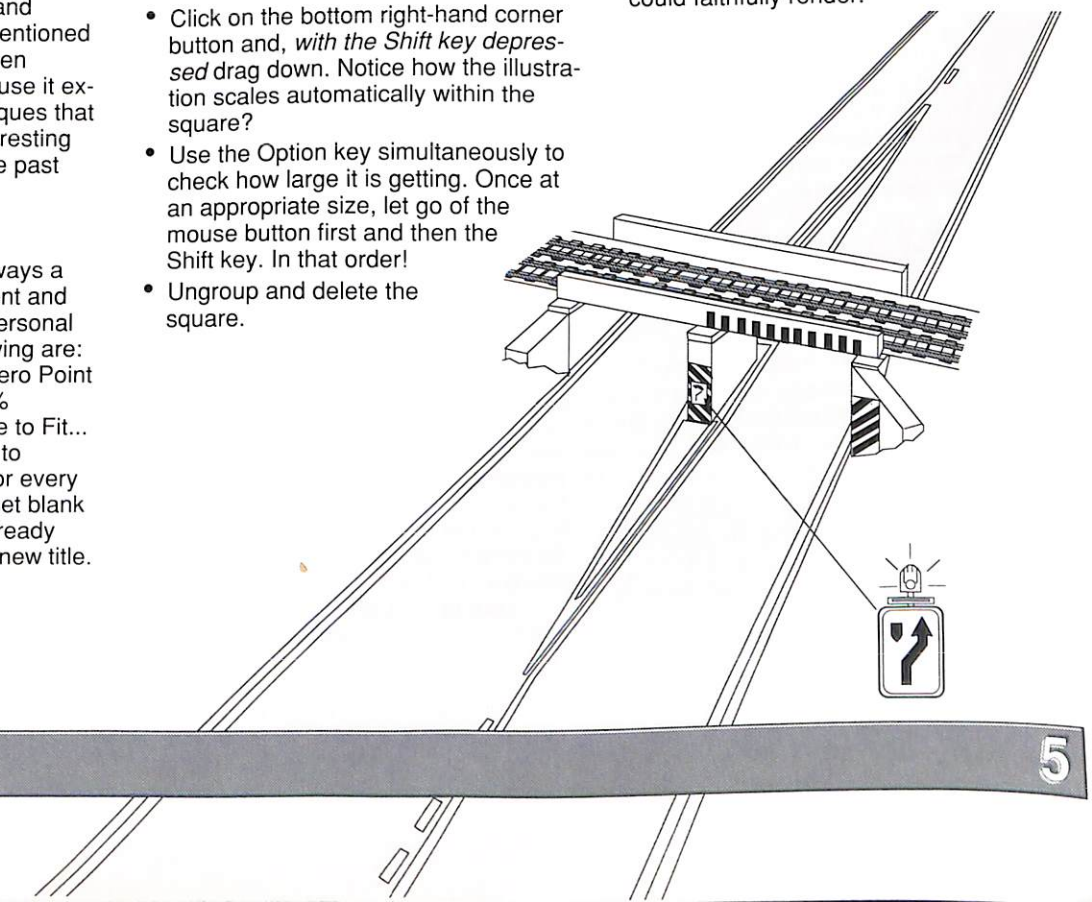
- First, group the items.
- Then, with the Shift key depressed draw a square that just slightly exceeds the limits of the art.
- Send it to back and then group it with the art.
- Click on the bottom right-hand corner button and, *with the Shift key depressed* drag down. Notice how the illustration scales automatically within the square?
- Use the Option key simultaneously to check how large it is getting. Once at an appropriate size, let go of the mouse button first and then the Shift key. In that order!
- Ungroup and delete the square.

LaserWriter and MacDraw

MacDraw's minimum line thickness of one point can be a severe drawback. It is far too thick for most of our work. As a result, we use the reduction feature of the LaserWriter to give us variable line thicknesses down to a minimum of about 0.3 of a point (that's one LaserWriter pixel). Most of our full page illustrations are actually drawn up over four pages by specifying 50% in the Page Setup dialogue box. This gives our artwork a more exquisite line quality than could otherwise be produced.

Specifying 50% gives us an added zoom capability and allows more swift and accurate positioning of lines. Full size stats (200%) can then be made of a Linotron printout... resulting in a far more accurate camera-ready original than could be produced by cutting four LaserWriter prints together.

The illustration below, produced for the new *Ontario Manual of Uniform Traffic Control Devices* was drawn at 50% and, although it took longer to scroll from one area of the illustration to another, the need for fine lines made such constraints worthwhile. The actual reduction on the artwork as it is printed here is now 34%, requiring a fidelity that only the Linotron could faithfully render.



E • D • I • T • O • R • I • A • L

Graphic

Extravagant claims have been made about the cost savings involved in assembling a publication electronically. Though many are familiar with the cost-benefits associated with producing lower-budget publications on microcomputers, the benefits of producing higher-end publications on the same equipment are only now becoming evident.

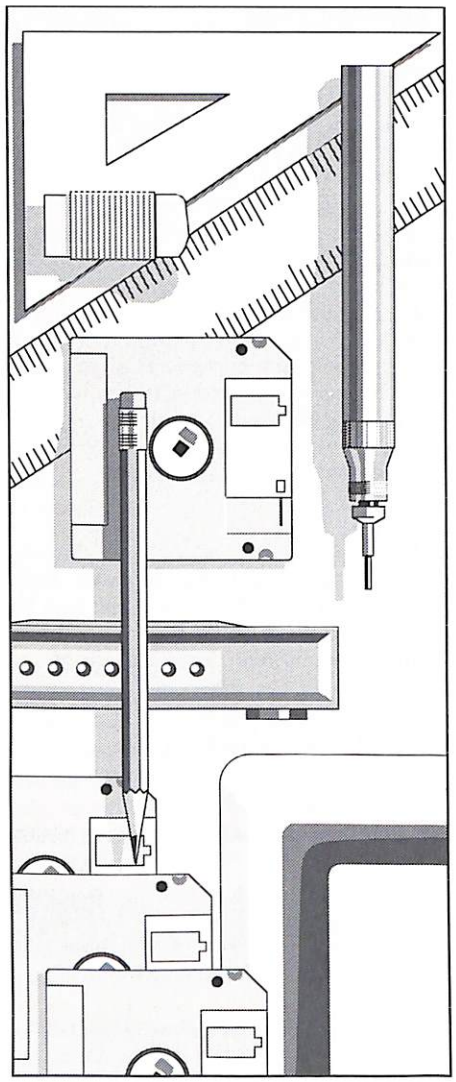
Surprisingly, in spite of new technology, costs for these more quality-conscious projects (annual reports, company promotions etc.) may continue to remain the same. However, the advantages of creating them on microcomputers are compelling in terms of the creative flexibilty they offer and the lower reliance on outside services.

With a versatile page description language such as PostScript, the capabilities of previously prohibitive computer-typesetting services and reprographic houses become available to the designer and typesetter.

Initial setting of the copy can be entered via the client's computer or word processor, sent to an editor via modem for literary touches and then sent on, again via modem, to the designer for graphic design and assembly (GraphiComp Design has a CNCP Electronic Mail box setup used for just this purpose). Different visual ideas can be tested without sending out for more typesetting or keying in the same data several times. These time and cost savings are reflected in several ways.

With a client who wants to produce a report, "electronic" designers are able to produce camera-ready artboards at lower cost and spend more time at the design aspect of the project, thereby improving the client's image. The client receives from the designers and typesetters a higher quality publication for far lower price than he or she would otherwise receive.

In larger corporations, similar savings are now being derived from the purchase of electronic publishing equipment for communications groups. Though there is usually a subsequent drop in the cost of using outside services, these costs do not disappear altogether.



Indeed, there is already a steady corporate demand for the services of freelance designers and consultants experienced in electronic publishing techniques to accommodate corporate overflow, to conduct training, or to produce designs for special case publications that may later be produced in-house. The designers' role may be changing, but in a way that respects their training and skills. Assembly projects requiring no special skills can now easily be accommodated in-house and the designer is free to pursue more challenging projects after having provided the initial guidance.

Typesetting can now replace daisy wheel printout for medium-quality publications and large, bulky projects. Additional savings can be made in the conversion of hand-drawn technical illustrations to disc-based, easily corrected files. Small newsletters can be created very inexpensively. This newsletter, for example, took the equivalent of two weeks for one person to put together, that includes the writing. Normally, this type of project would require the services of several people for almost twice as long—without considering the cost and time involved in securing the services of a writer or typesetter.

A net result of these developments is quite likely to be an *increase* in the amount of material published. With more material around, and greater access to the equipment to produce it, there is also likely to be an unfortunate increase in the amount of poorly designed, but well set, material. It is now becoming the responsibility of designers to change their marketing strategy to emphasise that corporate identity benefits only from publications of a high quality, well-designed nature.

This is an ideal that should also be conveyed when the designer is called upon to train people in the use of desktop publishing equipment. Training should not be a case of simply showing someone how to operate the machine—a manual can do that (though only if you read it!). Rather, training should be a combination of conveying swift operating techniques, an understanding of how the assembly process is structured and, most importantly, a concern for how the material on the screen should be transformed into a design that complements the material.

For this designer, the move from a drafting table has been a huge unstable leap. But fear of the brave new electronic world has been tempered by the realization that with microcomputers I can maintain a level of quality that is far higher and more cost-effective than I could achieve at my drafting table.

One day, all graphic designers will work this way!

...Simon Tuckett

T • Y • P • O • G • R • A • P • H • Y

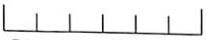
In order to understand how a page is rendered on the L300 or another PostScript compatible printer it may help to look at how the page description language interacts with the Macintosh applications.

```
0 setgray 43 660 moveto 28 0 rmoveto
/Helvetica findfont 10 scalefont
setfont
(n order to understand how a)show
43 648 moveto 28 0 rmoveto
(page is rendered on the L300)show
43 636 moveto 28 0 rmoveto
(or another PostScript com-)show
```

An example of the PostScript source code created automatically by the program JustText, for the introductory paragraph.

Icons of the Apple LaserWriter Drivers.

Twelve points in a pica



Six picas in an inch

Helvetica
Helvetica-Bold
Helvetica-Oblique
Helvetica-BoldOblique
Times-Roman
Times-Bold
Times-Italic
Times-BoldItalic
Courier
Courier-Bold
Courier-Oblique
Courier-BoldOblique
Σψμβολ (Symbol)

PostScript

PostScript is a powerful, flexible, device-independent text and graphics page description language developed by Adobe Systems. Although PostScript bears a superficial resemblance to FORTH, its concept and development was entirely independent. PostScript drivers in your Macintosh application create a PostScript program which communicates a description of how a page looks to a PostScript interpreter. The interpreter (firmware) then converts the program from the high-level PostScript description to the low-level raster data format required by the printer or output device. PostScript programs are created, transmitted and interpreted in the form of source text; there is no "compiled" or "encoded" form of the language. The PostScript language has a large selection of graphic operators that enable it to precisely describe a desired page. These operators control the placement of text, geometric figures and sampled images. PostScript files are plain 7-bit ASCII text, and since they contain no special characters, can easily be edited with conventional text-editors or sent over telephone lines.

If PostScript has a drawback, it is the fact that, as a language, it can be verbose — a generic Macintosh file can grow to several times its original size when converted to PostScript. To its advantage is the fact that a person who has a knowledge of the PostScript language can generate extremely complex pages — certainly far more complex than are available through any current Macintosh application — with nothing more than a text editor and a knowledge of the language. For those who may wish to explore PostScript further, *The PostScript Language Tutorial and Cookbook*, and the *PostScript Language Reference Manual* are available from your Apple Dealer or Addison-Wesley Publishing at (416) 447-6489.

PostScript Printing

Most Macintosh applications contain the PostScript drivers which enable their files to be printed on the LaserWriter or Linotype typesetters. It is not necessary to know what these are, or what they do; it is enough to know that they are there, and that they work. Generally, what you see on the Macintosh screen is what you will get from your output.

There are, however, a few exceptions. The basic units of measurement in printing are the point and the pica. A point is 1/72.27 of an inch. In designing PostScript, Adobe Systems rounded this to 1/72 of an inch. This rounding gives a nice whole number relationship between points, picas, and inches: 12 points =1 pica; 6 picas = 72 points = one inch. However, because of this rounding, LaserWriter or Linotype output may be very slightly off when checked with a pica rule. You can also see this difference if you compare LaserWriter or Linotype output with the same file printed on an Imagewriter or other non-PostScript printer.

Fonts

In PostScript, a Laser Font derives its extremely high quality and clarity from the fact that each letter is described in what is called the "font dictionary" as a series of connected arcs and straight lines. This allows the PostScript printer to do anything with the character; outline it, fill it with a shade or enlarge it to any size with no loss of clarity or edge sharpness.

For the past year there have been 13 Laser Fonts available from Apple and Adobe Systems. These include Helvetica, Italic, Bold and Bold Italic from the Helvetica family (The Mac's own Geneva font resembles Helvetica). The Times family (New York was patterned after Times) is represented by Times Roman, Italic, Bold and Bold Italic. Courier is available in the same four styles, but keep in mind that Courier is a monospaced IBM typewriter font (resembling Monaco), and will not give the same appearance when printed as do fonts from the Times and Helvetica families which are proportionally spaced. The final selection is Symbol, which is a collection of Greek mathematical and scientific symbols.

C · O · L · O · P · H · O · N

This publication grew in the making. At first, it was a single-page fact sheet to advertise the computer-based graphic services of my company. Indeed, it would have stayed that size had we not been asked by Neville Robertson of Ampersand to put some ideas together so that we could market our combined services for high-tech look newsletter production. The idea snowballed. The result you hold in your hand. We don't mean to stop here either.

There is a large amount of information floating around the industry on the topic of Desktop Publishing. It's an energetic atmosphere, and fortunately, we seem to have access to a lot of the information. So should other people. Hence: Graphic Perspective.

Our aim is this: that we produce a visually appealing and highly informative newsletter that deals primarily with the topic of Desktop Publishing. It will be Canadian in orientation and, for the first few issues, will undoubtedly deal largely with news on the equipment that we are using. We welcome articles on all types of equipment, software and techniques but retain the right to edit all material submitted. In each issue we intend to review various pieces of software that we have tested or are using. Our readers should feel free to write to us and recommend the type of material that they would like to see covered, after all, this is *your* newsletter.

We plan to take the unique approach of changing and modifying the design of future issues to reflect various styles and moods. This is not merely to improve the look of our portfolios but principally to give those of our readers already involved in desktop publishing other design ideas that they might not have considered. This first issue is free and we hope that seeing it will encourage you to make use of the enclosed subscription form for future issues. We look forward to your reading our premier issue in July.

...Simon Tuckett

Fine Print

About this Newsletter

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Subscribers to CNCP EOS can leave electronic mail in our box on System 21: AHY 001

Nuts and Bolts

This publication was produced entirely on Apple Macintosh 512k computers. The text portion was written in JustText utilising the Helvetica and Times-Roman typeface families. All object-oriented illustrations were created in MacDraw. Bit-mapped images were created with MacPaint and LaserTools. Graphic effects for the publication were written from scratch in PostScript. All files were converted to PostScript before being proofed on an Apple LaserWriter Plus. Final camera-ready art was produced by downloading those same files to Ampersand's Allied Linotype L300 imagesetter. Absolutely no paste-up was necessary.

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Editor . . . . . Simon Tuckett
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Graphic Design . . . . . Sherry Hedger
PostScript programs
& Illustrations . . . . . GraphiComp
Copy Editing . . . . . Rob Lockhart
Output production . . . . . Don Scally
(& Pizza). . . . . Susan Killoran
Printing . . . . . P.R.W.

Ampersand logo rendered in PostScript by FTL Systems Inc.
234 Eglinton Avenue East, Suite 205
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Programs mentioned...

JustText™ and *LaserTools*™ by Knowledge Engineering, GPO Box 2139, New York, NY 10116 U.S.A.

PageMaker by Aldus Corporation Suite 400, 616 First Avenue, Seattle, WA 98104 U.S.A.

ReadySetGo by Manhatten Graphics 163 Varick Street, New York, NY 10013 U.S.A.

MacDraw and *MacPaint* by Apple Computer, Inc., 7495 Birchmount, Markham, Ontario, Canada L3R 5G2

Equipment mentioned...

Macintosh and LaserWriter computers by Apple Computer, Inc., 7495 Birchmount, Markham, Ontario, Canada L3R 5G2

Linotronic 300 imagesetter by Allied Linotype Canada, 201 Watline Avenue, Mississaugua, Ontario, Canada L4Z 1P3

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